Final Draft

Renewable Generation Scenarios For 33% RPS Transmission Planning

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Background:

CAISO has embarked on an initiative to develop an Order 890 compliant proactive transmission plan intended to deliver the output of the needed renewable resources to meet California's 33% Renewable Portfolio Standard (RPS) energy requirements.[1] CAISO also intends to develop the necessary tariff so that its board of governors can systematically approve those proactive renewable transmission plans that the CAISO staff develops years before the renewable resource development picture for the CAISO member LSEs is finalized. The CAISO initiative is expected to lead into a set of CAISO Board approved transmission projects.

At the same time, a coalition of California transmission owning and operating entities have also created a **voluntary regional planning group**, named CTPG (California Transmission Planning Group), intended to study and recommend solutions for California's regional transmission planning needs. The first assignment that CTPG has undertaken is to develop a transmission plan intended to deliver the output of needed renewable resources to meet the state's 33% RPS energy requirements. There is no definite indication as to how the transmission plan prepared by the CTPG will be used by the CTPG members for their planning activities.

This report is not intended to concern itself with seams issues between the aforementioned two initiatives. Our goal is to ensure that, given the cost and environmental impact of transmission development, only the proactive renewable transmission infrastructure that is known to be necessary, based on the best available information, be approved by the appropriate bodies for development.

CalWEA has already been proposed a broad methodology to develop such a proactive renewable transmission plan to CAISO – see appendix to this document. The same methodology may also be used by CTPG for performing its transmission planning

[1] As stated in CalWEA's initial comments, we believe that, to meet with success at FERC and potentially in court, the CAISO's initiative must rest on an RPS requirement that is codified in law.

studies. A key first step in implementing the methodology presented in the appendix involves the development of a number of credible renewable resource development scenarios to meet the state's 33% net short renewable energy needs – such scenarios are critical for developing the proactive renewable transmission planning basecases and solutions. This document describes the criteria and methodology for developing those credible renewable resource development scenarios.

Credible Renewable Resource Development Scenarios

We propose that at least five credible renewable resource development scenarios be used by the CAISO (or the CTPG) for performing its proactive renewable transmission planning exercise. The common elements among all of these proposed scenarios would be:

- All renewable generation resources that have signed LGIA should be included in each of the renewable development scenarios (base cases);
- The output level of renewable generators for a basecase should correspond to the expected level of generation from that class of generators (e.g., modeling wind generation at peak capacity at the time of system peak condition would not comply with this feature);
- Firmed and shaped deliveries from outside California balancing authorities to the LSE should be properly modeled in all peak or off-peak base cases where such deliveries are made;[2] and
- Renewable generation should, to the extent practicable, be deliverable to California LSEs based on their 33% RPS net short through their Balancing Authority. This would require that in all study basecases, the existing non-RPS eligible generation in an LSE area be dispatched down to accommodate renewable generation from outside the general LSE area. The magnitude of such down-dispatch should be selected such that that magnitude plus MW of all non-RPS eligible generation that are retired in the general LSE area, due to OTC

[2] This is an area where the details of the state's 33% RPS requirement will influence planning – e.g., the extent to which energy must be delivered to California or unbundled RECs without energy are permitted, etc. To support planning for transmission development, these details must be clearly set forth.

mandate and other reasons, is by and large proportional to the 33% RPS renewable net short for that LSE. Enforcement of this requirement should be straightforward for the system peak load condition. For the off-peak load conditions, this requirement may be modified to account for the **Reliability Must Run** generation requirements for that off-peak basecase. This may require that the RPS eligible renewable generation be dispatched at less than their known capability at that off-peak load condition.

We propose the following five (5) renewable development scenarios as credible for use by the CAISO in developing its study basecases – we assume that the CAISO will develop one peak and at least one off-peak basecase for each of these scenarios.

Scenario 1: Commercial Interest Showing Scenario

The renewable resource development picture in this scenario is solely based on the known commercial activities that are currently underway in the WECC and are targeted to meet California's RPS needs. The criteria for selecting renewable resources for this scenario will be as follows:

- All renewable generators in the CAISO serial queue that are in their Facility Study stage and all renewable generators in the CAISO transition cluster that have entered the Phase II studies would be included in the base case.
- All renewable generators in the queue in any of the WECC balancing authorities that are in the Facility Study stage and have an approved PPA with a California LSE would be included in the base case.[3]
- If, after including all renewable generators identified above, there is still a need to add renewable generators to meet the 33% RPS net short, the remaining generators should be selected from the pool of generators that are in a queue of any balancing authority in the WECC, at any stage of LGIP studies, and have an approved PPA with a California LSE, starting with those generators that have the earliest operational dates in their PPAs.

Scenario 2: RETI Basecase Scenario

[3] If these scenarios are to be used to develop CAISO's PRTP, these will be CAISO member LSEs. [?]

The renewable resource development picture in this scenario will be solely dependent on RETI base case ranking of renewable resource development zones inside and outside California:[4]

- Step 1 – Selection of CREZ: Renewable development zones inside and outside CA (for simplicity we will call all of these CREZs) are ranked based on their economic and environmental factors.[5] All CREZs that are in the first quadrant (the ones that have both their economic and environmental scores below their respective median values) would be picked for this purpose. If the amount of energy in the CREZs of the first quadrant is less than twice the net energy short to meet the state's 33% RPS goal, the boundaries of the quadrants should be extended proportionally on both the economic and environmental axes such that the amount of energy in all CREZs in the first quadrant reaches at least twice the net short for state's 33% RPS goal.
- Step 2 - Selection of Energy Content in Selected CREZs: An equal percentage of the resources in each of the selected CREZs above would be identified as having been developed under this renewable resource development scenario. The equal percentage should be selected based on the total energy needed to meet the net short for state's 33% RPS goal.
- Step 3 – Selection of Technology in Selected CREZs: Selection of the size of a technology resource that would have been developed in each CREZ would be made based on economic ranking of such technology in that CREZ.[6]

Scenario 3: RETI Wind Case Scenario

This scenario will be identical to Scenario 2 except that the RETI Phase 2A CREZ environmental rankings from Appendix N, or a more updated version, are used, based on the industry accepted wind generation footprint impact of 2 to 5 percent of the wind project lease area as opposed to 100% of the lease area as used in the RETI base case.

Scenario 4: RETI In-State Scenario

This scenario will be identical to Scenario 2 except that only CREZs that are located in-state or border the state (could have direct tie inside the state) would be selected to generate the 33% RPS energy net short.

[4] RETI CREZ data reflect the information from other similar West-wide initiatives such as WREZ.
[5] All out of state development areas that do not have an environmental score should be assigned a proxy environmental score. For CREZs just outside CA border, the information from their counterpart across the border inside CA could be used to determine their environmental score. For CREZs that are farther away from the CA border, environmental score may be developed based on information available from other sources including the WREZ initiative.
[6] Use of economic score for selecting technologies in a CREZ would be consistent with the typical RFO process for procurement of renewable resouces.

Scenario 5: WREZ Based Scenario

This scenario will be identical to Scenario 2 except that CREZs are selected based on the development priorities made as part of the WREZ initiative. Since CREZ ranking in WREZ initiative may be one dimensional only, all the arguments presented in Scenario 2 should be modified (a very straightforward process) to reflect the single dimensionality of the CREZ ranks.[7]

[7] It should be noted that similar to Scenario 1, the goal here is to simply establish the boundary conditions for the development scenario.

Appendix: A Proposal for Proactive Renewable Transmission Planning

This proposal refines the CAISO's straw proposal for developing a transmission plan to facilitate achievement of 33% renewables, though it is still presented at a high level. We look forward to feedback and additional ideas from the CAISO and other stakeholders on the proposal.

The goal of the CAISO Proactive Renewable Transmission Plan (PRTP) is to proactively develop a "least regrets" network transmission expansion plan to identify facilities that are needed to deliver sufficient renewable generation resources by 2020 to meet the requirements imposed by a California 33% RPS statute under a variety of credible renewable generation development scenarios. The plan must:

- Seamlessly integrate with the LGIP Phase II study process; and
- Seamlessly integrate with the traditional TPP process intended to identify system needs to address CAISO controlled grid reliability and economic congestion.

1. Proactive Renewable Transmission Plan (PRTP)

The main goal of this exercise is to address the long lead time associated with building the needed transmission infrastructure to deliver renewable resources. These long timelines are normally associated with the transmission permitting process and can be three to four times longer than the time that it takes to develop the renewable resources themselves. By planning core transmission elements in advance, the PRTP will allow engineering, permitting and even construction of transmission infrastructure before the complete picture for renewable resource development is known. We believe that two principles must be followed in developing the PRTP:

- Identify and facilitate transmission that is highly likely to be needed, to avoid stranding of transmission infrastructure; and
- Treat all potential generation projects equitably, to avoid giving an undue preference to a particular group or class of renewable resource developers.

The broad methodology presented below for developing the PRTP meets the aforementioned principles. Inspired by the work of the California Renewable Energy Transmission Initiative (RETI) and adapted for use by the CAISO, this methodology would develop a least regrets transmission plan that would be needed under most, if not all, ***credible*** renewable resource development scenarios.

The approach for development of PRTP consists of the following broad steps:

a. Step 1 - development of several (at least five) renewable resource development scenarios (base cases). Each scenario would correspond to one renewable resource development outcome that could meet the state's "net short" renewable

generation figure.[8] The credible renewable resource development scenarios should be developed as part of stakeholder process such as RETI. However, at least one such scenario should closely match commercial interest showings by renewable resource developers serving the load in the CAISO footprint. All generators that have signed LGIAs along with their identified transmission upgrades would be included in all such scenarios.[9]

b. Step 2 – development of a renewable transmission plan for each of the renewable resource development scenarios. This step calls for the CAISO and the PTOs to develop a comprehensive transmission plan for each of the renewable resource development scenarios developed in Step 1. Such a transmission plan should follow these principles:

i) The level of generation from each renewable resource for each study case (e.g., summer peak condition) should be representative of the expected generation from that resource for that study case (i.e., wind generation should not be assumed at full output when studying the summer peak condition);

ii) The existing conventional generation resources in different parts of the state that must be dispatched down to accommodate the added renewable generation should correspond to the renewable net short for that part of the state;

iii) Selection of the transmission components of each transmission plan should account for feasibility of permitting such components; and

iv) Some downward flexibility should be assumed for renewable resources, consistent with the CAISO's upcoming market initiative to encourage such flexibility.

c. Step 3 – development of the least regrets renewable transmission plan. In this step the specific components of the PRTP are selected based on the following criteria:

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[8] The "net short" is the generation target to be met. The net short takes into account RPS demand, base case resources, and small renewables not directly considered.

[9] It is worth considering whether a generator that has signed its LGIA but whose network upgrades are not yet under construction, and where these network upgrades are not needed for other projects that have completed their Phase 2 Study or Facility Study, should be offered the opportunity to revoke its LGIA and have its studies repeated after PRTP is completed as described below. This option could be provided in order to allow the generator to benefit from the network upgrades identified through the PRTP. A generator taking this option would lose all the certainties associated with their signed LGIA and would be eliminated from the base case. Also see the section below on Integration with LGIP Phase II Process.

i) All transmission components that are common to at least 80% of the renewable transmission plans developed in Step 2, and

ii) All 230 kV and higher voltage transmission components that are common to at least 50% of renewable transmission plans developed in Step 2.

When determining common upgrades across renewable transmission plans in Step 2, care should be taken to ensure that similar upgrades, which are intended to achieve the same solution across multiple scenarios, are merged into one solution that would solve all such scenarios in a least-cost and efficient manner. For example, if the addition of a 230 kV line is required for the renewable transmission plan for one scenario from Step 2, and the addition of a 500 kV line is needed in a second renewable transmission plan from Step 2 as well as those of the first one, a common upgrade between the two cases should be considered to be the addition of the 500 kV line. Also, the development timelines of common upgrades should correspond to the earliest timeline for such upgrades among the renewable transmission plans of Step 2.

d. Step 4 – unconditional approval of the renewable transmission plan. In this step all the least regrets transmission facilities identified in Step 3 will be presented to the CAISO Governing Board for its approval. The approved projects would constitute the CAISO PRTP and would be eligible for direct rate-basing in the CAISO TAC.

The development of a CAISO PRTP is expected to take place sparingly and only when a major renewable resource development initiative is enacted by the state. However, a recalibration of the CAISO PRTP, to the extent possible and needed, would take place on an annual basis based on the new and actual information on the renewable development picture within the state.

2. Integration with LGIP Phase II Process

The LGIP Phase II process is intended to identify the actual transmission upgrades for a cluster of generators that have moved into Phase II studies.[10] The LGIP Phase II studies can be readily integrated with the CAISO PRTP by including all the components of the PRTP in the Phase II study base case used for the LGIP Phase II studies.

The cost of the additional network transmission projects (beyond those in the PRTP), determined as part of the Phase II cluster studies, would be allocated to the generators in Phase II per the CAISO existing tariff. Those costs would include any costs to accelerate the build-out of PRTP components to an earlier year.

[10] The generators in the cluster may not necessarily all be fueled by renewable energy.

The CAISO and Stakeholders should consider whether (and under what circumstances) interconnection customers in the current Transition Cluster or Serial Queue should have the option of delaying their Phase II studies and Facilities Studies, respectively, until the PRTP is finalized. Given the possible benefits of the outcome for the grid and the generation projects, creating such an option may be very beneficial.

3. Integration with Traditional TPP Process

After the development of the CAISO PRTP, the determination of the transmission system needs due to reliability and economic congestion concerns (that are traditionally performed as part of the annual TPP) could be readily integrated with the PRTP by incorporating the PRTP-approved transmission components in the study base cases used for such studies by the CAISO and the PTOs.